

1 1. A multi-chip module comprising:
2 a laminate layer having top and bottom sides and
3 a passage;
4 a first chip secured to the bottom side of said
5 layer, said first chip wire bonded to the top side of said
6 layer through said passage;
7 a second chip secured to the top side of the
8 layer and coupled by bumps to said layer; and
9 said layer including an extension beyond at least
10 one of said chips, said extension including solder ball
11 contacts on said bottom side, electrically coupled to said
12 first and second chips.

1 2. The module of claim 1 including a pair of opposed
2 extensions each extending outwardly beyond the rest of the
3 module and each having contacts.

1 3. The module of claim 1 wherein said extension
2 extends all the way around said module.

1 4. The module of claim 1 wherein said first chip is
2 bonded to said layer using adhesive securement.

1 5. The module of claim 4 wherein said adhesive
2 securement is adhesive tape.

1 6. The module of claim 1 wherein the overall height
2 of said module is approximately one millimeter or less.

1 7. The module of claim 1 wherein said first and
2 second chips are aligned one over the other and centered
3 over said passage.

1 8. The module of claim 7 wherein said passage is
2 centered in said layer.

1 9. The module of claim 1 wherein said package has
2 bilateral symmetry.

1 10. The module of claim 1 wherein said region between
2 said first and second chips is filled with encapsulant.

1 11. The module of claim 1 wherein said extension
2 extends outwardly beyond said first and second chips.

1 12. A method of forming a multi-chip module
2 comprising:
3 adhesively securing a first chip to a first
4 surface of a laminate layer;
5 inverting the assembly of said laminate layer and
6 said first chip;

7 wire bonding said first chip to a second surface
8 of said laminate layer;
9 securing a second chip to the second surface of
10 said laminate layer using bumps;
11 positioning said first and second chips on said
12 laminate layer so that at least a portion of said laminate
13 layer extends outwardly beyond said first and second chips;
14 and
15 providing solder ball contacts on said first
16 surface of said extension electrically coupled to said
17 first and second chips.

1 13. The method of claim 12 including aligning said
2 first and second chips over one another.

1 14. The method of claim 13 including providing a pair
2 of extensions extending outwardly beyond said first and
3 second chips.

1 15. The method of claim 13 including aligning said
2 chips so as to form an extension of said laminate layer
3 that extends outwardly beyond said chips and completely
4 around said module.

1 16. The method of claim 14 including providing solder
2 balls on said contacts on said extensions.

1 17. The method of claim 12 including filling a region
2 between said chips with an encapsulant.

1 18. The method of claim 17 including forming a
2 passage through said laminate layer and forming wire bonds
3 from said first chip through said passage to the second
4 surface of said laminate layer.

1 19. The method of claim 17 including coupling said
2 contact and said first and second chips through traces
3 extending through said laminate layer.

1 20. A multi-chip module comprising:
2 a central support layer having a top side and a
3 bottom side, a bonding pad on each of said sides and
4 conductive interconnections extending through said layer;
5 a first chip secured to the bottom side of said
6 layer;
7 a second chip secured to the top side of said
8 layer, said second chip secured by bumps to said layer; and
9 said layer extending outwardly beyond said first
10 and second chips, said layer including a solder ball pad on
11 an extension extending outwardly beyond said first and
12 second chips for electrically connecting said chips to
13 external devices.

1 21. The module of claim 20 wherein said layer is a
2 laminate layer.

1 22. The module of claim 20 wherein said first chip is
2 adhesively secured to said layer.

1 23. The module of claim 22 wherein said first chip is
2 secured by adhesive tape to said layer.

1 24. The module of claim 20 wherein said layer
2 includes a central aperture, said first chip wire bonded to
3 the top side of said layer through said aperture.

1 25. The module of claim 20 having an overall height
2 of less than approximately 1 millimeter.

1 26. The module of claim 20 wherein said extension
2 extends outwardly beyond said first and second chips in two
3 directions.

1 27. The module of claim 20 wherein said layer extends
2 beyond said chips completely around said chips.

1 28. The module of claim 20 wherein said first and
2 second chips are aligned with one another and positioned
3 centrally on said layer.

1 29. The module of claim 28 wherein a passage is
2 formed centrally through said layer for wire bonding said
3 first chip to said layer.

1 30. A method comprising:
2 coupling a first chip to a first side of a
3 support structure;
4 coupling a second chip to a second side of said
5 support structure;
6 causing said support structure to extend
7 outwardly beyond the first chip; and
8 providing solder ball pads on the portion of said
9 structure extending outwardly beyond said first chip, said
10 pads electrically coupled to said first and second chips.

1 31. The method of claim 30 wherein coupling a first
2 chip includes adhesively coupling a first chip to said
3 support structure.

1 32. The method of claim 31 wherein coupling a first
2 chip includes wire bonding said first chip to bonding pads
3 on said second side of said support structure.

1 33. The method of claim 30 wherein coupling a second
2 chip includes bump bonding said second chip to said second
3 side of said support structure.

1 34. The method of claim 30 wherein causing said
2 support structure to extend outwardly includes causing said
3 support structure to extend outwardly from two opposed
4 edges of the first chip.

1 35. The method of claim 34 wherein causing said
2 support structure to extend outwardly includes causing said
3 support structure to extend outwardly beyond four edges of
4 said first chip.

1 36. The method of claim 30 wherein causing said
2 support structure to extend outwardly includes causing said
3 support structure to extend outwardly beyond said first and
4 second chips.

1 37. The method of claim 30 including coupling said
2 first and second chips to said solder ball pads on said
3 portion via traces extending through said structure.